WHERE THE RUBBER HITS THE ROAD LESS TRAVELLED: BRIDGING TECHNICAL AND CULTURAL UNDERSTANDINGS OF MARAE ON-SITE WASTEWATER TREATMENT AND DISPOSAL

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ABSTRACT

Te Riu o Hokianga is a Māori community development research project involving the Institute of Environmental Science and Research (ESR) Ltd and Hokianga Health Enterprise Trust (HHET) working in partnership with Hokianga hapū and iwi to improve marae-based sewage treatment and disposal systems. Multi-agency hui were held with representatives from district and regional councils, independent engineers, funders and hapū. These hui surfaced the idea of a 'roadmap' as a tool to assist hapū navigate through the wastewater management area.

The roadmap sets out a tikanga-based kaupapa Māori process associated with activities for upgrading marae on-site wastewater systems. In supporting hapū wastewater 'literacy', the roadmap represents an attempt to bridge the divide between hapū and local government approaches to on-site systems problems/issues. This work revealed the extent of differences between technical and cultural perspectives, including divergent understandings of wastewater discharge and its effects, where the authority to determine land use and the acceptability of discharges lies, and the role/legitimacy of marae in this regard. This paper outlines the strengths and weaknesses of the roadmap in mediating hapū and council worldviews and creating understanding between parties. Broader implications for mana whenua and local authority partnership and excellence in wastewater management are also discussed.

KEYWORDS

On-site wastewater management; marae; kaupapa Māori; roadmap; hapū wastewater literacy, multi-agency working

1 INTRODUCTION

Failing on-site wastewater systems, through their potential for transmission of infectious disease pose a significant health risk to isolated rural communities (Witten et al., 2000; Public Health Advisory Committee, 2002). Untreated or poorly-treated wastewater discharge can contaminate drinking water, mahinga kai, hōpua kaukau[1] and soil with pathogens including Hepatitis A, *Cryptosporidium*, *Giardia* and *Campylobacter* (Auckland Regional Public Health Service, 2005). This has potential to impact significantly upon marae, most of which are located in rural areas (Te Puni Kōkiri, 1999 cited in Durie, 2001).

The Hokianga is one region in which concern has been expressed about inadequate marae on-site wastewater treatment and disposal (OSTD), where in 1998 a Hepatitis A outbreak was caused by a failing marae septic tank. Management of the outbreak required vaccination of 800 people against Hepatitis A (New Zealand Public Health Report, 1999). A survey by HHET of the 36 marae that participated in the Ministry of Health (MoH) Ngā Puna Wai o Hokianga safe drinking water pilot project found that while marae had access to safe drinking water, a number of OSTD systems were failing due to increased wastewater volumes, inadequate maintenance, poor siting and inappropriate designs not meeting the unique wastewater needs of marae[2].

Current approaches for improving OSTD are often based on simplistic notions of intervention/improvement, with a focus on technologically advanced designs and household education programmes (Leonard & Foote, 2004). Given that marae OSTD systems can fail for a number of reasons, these interventions/improvements inappropriately place the burden of responsibility on individual whānau and tend to be developed with limited understanding of the needs and financial resources of whānau, hapū and iwi. Culturally appropriate solutions cognisant of the social and economic circumstances of Māori are required.

At the completion of Ngā Puna Wai o Hokianga, concerned hapū approached HHET about addressing marae wastewater needs (Foote, Hepi, Rogers-Koroheke and Taimona, 2005). In partnership with ESR, the University of Auckland and Tipa and Associates, HHET obtained Health Research Council funding for Te Riu o Hokianga to investigate whether Māori community development principles and processes could be used to tackle marae on-site wastewater issues. The premise of Te Riu o Hokianga is that solutions to marae wastewater problems need to be based on tikanga and kawa in order to be effective and that environmental health practices "based on Māori social structures and delivery systems, and controlled and delivered by Māori are more likely to contribute to Māori development goals" (Conway et al., 2000, p.343). This is consistent with a sustainable development approach to wastewater management, linking environmental, social, cultural and economic concerns, and developing communities in a way that brings these together (Ministry for the Environment (MfE), 2003). Applying a similarly broad perspective, this paper considers marae on-site wastewater systems management in four parts: 1) outlining cultural and technical perspectives of wastewater and its management; 2) discussing how these understandings have been integrated in specific projects given sector complexity; 3) reflecting on the contribution of the Te Riu o Hokianga 'roadmap' to wastewater management improvement and community development outcomes; and 4) how these findings may be applied to mana whenua engagement across a range of environmental issues.

[1] English translations can be found in the glossary.

[2] System design needs to cater for: the shock loading that occurs when a large number of people return to the marae to attend hui, tangihanga or weddings stressing OSTD systems; traditional kai high in fat (e.g. boil-ups) that greatly reduces OSTD effectiveness; and maintenance requirements – in areas with few employment opportunities such as the Hokianga, the majority of the workforce is often working in bigger towns and cities, therefore kaumātua and tamariki (who may lack the needed maintenance skills and income) may need to take on the role of maintaining OSTD systems.

2 UNDERSTANDINGS OF WASTEWATER AND ITS MANAGEMENT

2.1 CULTURAL CONCEPTS AND PRACTICE

Disposal and management of sewage, through necessity, was a significant feature of traditional Māori society (Durie, 1998; Pauling, 2005). Based on a holistic worldview in which people and all living and non-living things are linked, there are several concepts central to a Māori perspective that have implications for wastewater management (MfE, 2003):

- **Mauri**: traditional Māori understandings involve the belief that each life form possesses a life force or essence, known as mauri, through which it is connected to all other things. Given this interconnectedness, any actions that change or degrade the mauri of one thing will have a corresponding impact on the form or integrity of another (MfE, 2003). Human-derived wastewaters are considered to be spiritually defiled. Until they are purified by passage through the earth and their mauri restored, these wastewaters will contaminate or degrade the mauri of water or other matter that comes into direct contact (Tiakiwai et al., 2004).

- **Tapu/noa/rāhui**: these concepts, referring to restriction, non-restriction and temporary prohibition respectively, are forms of social control which manage the interrelationship of people and the environment (Durie, 2006). The tapu/noa categorization is the basis of Māori waste management practice (Pauling, 2005), used to minimize public health risks by regulating access to areas contaminated by human waste. In traditional Māori society paepae hāmuti were carefully separated from both kāinga and water sources (Durie, 1998; Mead, 1998). The process of human waste being cleansed by passing through Papatūānuku/ the earth is one of whakanoa; reducing the tapu of the waste, making it noa and thus rendering it usable again. Some Māori have formed the view that waste processing plants perform a similar process in place of the earth (Love, 1998). As a result of these beliefs, Māori tend to advocate for treatment and disposal options involving land application rather than discharge to sea (Pauling, 2005).

- **Kaitiakitanga**: protection of the mauri of people and the natural environment is central to the guardianship role held by hapū and iwi. The relationship between tangata whenua and the natural environment is based on reciprocity and responsibility; in traditional times the protection of culturally significant and food gathering sites by kaitiaki would ensure that food was available when required and that the spiritual and physical well-being of Māori communities was maintained (Ford, 1989; Roberts et al, 1995; Durie, 1998; Tiakiwai et al, 2004). The importance of food for survival was matched by its significance in upholding the mana of the tribe. The provision of an impressive feast or gift of food for others demonstrates a hapū or iwi's expertise in the practise of environmental kaitiakitanga, thereby maintaining and enhancing their prestige/standing (Roberts et al, 1995). Degradation of mauri resulting from contamination of food and water sources makes these unsuitable for traditional food gathering uses and values, thereby compromising the ability to manaaki/provide for manuhiri and causing whakamā (MfE, 2003; Tiakiwai et al, 2004). Thus, for Māori effective wastewater management has far-reaching effects, beyond guaranteeing good health to the fulfilment and retention of cultural practices, obligations and identity.

Tangata whenua understandings and values associated with wastewater management are significant for two reasons. Firstly, recognising both principles of participatory democracy and the direct and long-term impact of wastewater management on communities, local authorities are aware of the need to develop solutions that are acceptable to the communities in which they will be implemented (Cheyne & Comrie, 2002; MfE, 2003). Engaging community perspectives in consultation and increasing community involvement in decision-making goes some way toward delivering such solutions (Cheyne, 2002; Cheyne & Comrie, 2002). Secondly, traditional Māori understandings are consistent with the ecosystem-focused approaches resulting from a wastewater management paradigm shift in recent times (MfE, 2003). This has seen the increased integration of human wastewater systems into natural processes. Such approaches, provided they can continue to ensure protection of human health, are potentially more efficient, with less environmental impact (MfE, 2003). Thus, cultural understandings have much to offer the field of wastewater management, linked to positive outcomes as a result of environmentally sustainable, viable and socially acceptable solutions.

2.2 TECHNICAL APPROACHES

Although Māori cultural concerns about the treatment and disposal of human effluent are founded far back in traditional life (Pauling, 2005), technical approaches and practices have dominated waste management in New Zealand since European settlement (Morgan, 2004). Recommendations for water-based transport and removal of sewage from the British Royal Commission into Sewage Disposal (1898 – 1915) led to the adoption of a narrow range of sewage options early in the 20th century (Morgan, 2004). The Royal Commission marked the triumph of water-carriage technology over dry conservancy methods of dealing with sewage. Water carriage made waste disposal a more automatic procedure and a public rather than individual responsibility, of particular appeal to authorities and the engineering and medical professions of the day (Beder, 1989). Built and managed primarily in response to concerns about public health, resulting wastewater systems operated as if they were separate from the surrounding natural ecosystem (Beder, 1989; MfE, 2003). The focus was on end-of-pipe treatment followed by disposal of the treated wastewater and application of engineering and technology to meet minimum regulatory standards (MfE, 2003). Little thought was given to pollution of waterways or broader environmental impact.

With the publication of the Exeter septic tank system in The Lancet in 1898, OSTD became commonly used throughout the world (Leonard & Foote, 2004). Small New Zealand communities in unsewered areas continued to have on-site systems well into the 1960s and 1970s, and in 2001 the Community Sewerage Information New Zealand (CoSINZ) database showed approximately 10% of the population were reliant still on some form of OSTD (BECA, 2001). Graham (2003) notes that OSTDs vary between communities but septic tanks and seepage trenches/drainage fields are still commonplace. On-site systems more closely fit a land-based, Māori wastewater management approach. However, as noted by Leonard and Foote (2004), the technical, regulatory and organizational complexity of this area has marginalized communities, including Māori and those that are marae-based. This is significant, given that community understanding and input at various stages will maximize OSTD success: firstly, community members can provide information on specific site conditions to ensure appropriate system design and proper treatment of wastewater, and secondly, community understanding of OSTD operation will enhance the ability of members to monitor OSTD performance and undertake maintenance where necessary. Technical domination of the wastewater management area reflects the lack of meaningful participation by tangata whenua, a current barrier to optimal wastewater management, and Māori development aims.

2.3 COMPETING WORLD VIEWS

Although water-based sewage disposal systems are generally objectionable to tangata whenua, these have formed the basis for predominant practice and continue to be promoted as the most efficient and effective approaches for dealing with human effluent today (Morgan, 2004). Māori dissatisfaction with wastewater management is evident in Waitangi Tribunal claims from the late 1970s concerning sewage schemes proposed by local and central government agencies to discharge human effluent into waterways (Wai 3, Wai 4 and Wai 6) and since the Resource Management Act 1991 in iwi management plans, which set out tikanga and kawa pertaining to human waste discharge. From a survey of Ngāi Tahu iwi members, Pauling (2005) reports similarly widespread dissatisfaction with current practices such as centralized systems and flush toilets, but inaction from a sense of hopelessness regarding scientific and political influences. This skepticism would appear to be well-founded, given the difficulties encountered in seeing Māori beliefs and principles upheld in wastewater management policy and practice.

Despite a commitment by central government to the incorporation of Māori perspectives and Māori participation in waste management planning and waste prevention (MfE, 2002), adoption at the local level has been inconsistent and slow to eventuate. Morgan (2004, p.4) sees this as a problem of the "juxtaposed paradigms of municipal engineering on one hand and tangata whenua values and beliefs on the other", and decision-makers' preferences for a more accessible standpoint of public health and safety over "spiritual sensitivities". While

there has been acknowledgement of Māori concerns about dispersing wastewater directly into water, these views appear to hold little weight in the consideration of wastewater treatment and discharge applications. Tiakiwai et al (2004) note that transferability of traditional Māori waste management solutions is difficult in the current context because of changes to the cultural, physical and regulatory environment, an environment in which Māori control is limited.

Consideration of non-Māori and Māori worldviews within Te Riu o Hokianga yielded important findings regarding current marae on-site wastewater management, with implications for mana whenua engagement. In the first instance, the right assumed by Crown regulatory authorities to determine marae land-use for wastewater treatment plants and the acceptability of wastewater discharges was highly contested by hapū members, since this was seen as conflicting with hapū mana and capacity to exercise authority. Marae are not ratepayers and as such did not expect regulatory agencies would determine their needs or how those could best be met. Furthermore, due to the location of marae OSTDs on Māori land, hapū members perceived that authority relating to the management of these systems would rest with them, not expecting that they would be required to engage with local councils on the matter, subject to regulatory compliance, or associated costs. Figure 1 depicts this difference in understandings as a clash of boundary judgments; the conflict arising when wastewater discharge is understood in terms of tikanga and kawa by mana whenua, compared with understanding in terms of an 'effect' by local government agencies (see Figure 1).

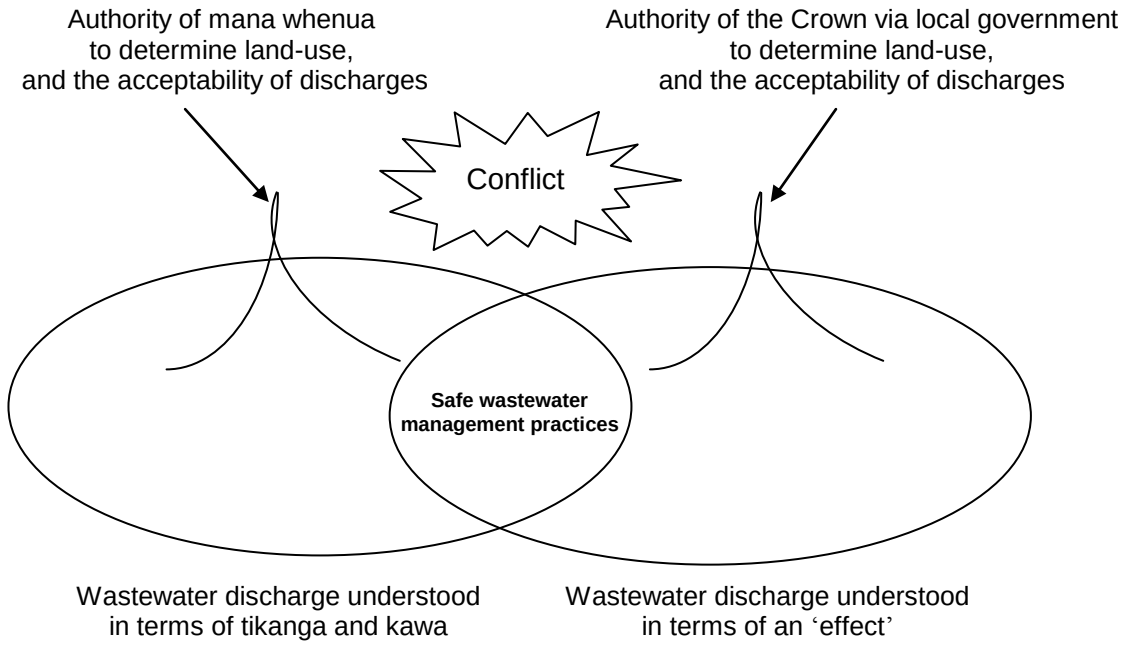

Figure 1: Marae wastewater management as a contested field based on authority to determine land use and the acceptability of discharges

A major barrier to hapū participation has been the need to obtain appropriate building and resource consents before funding agencies are willing to fund on-site wastewater treatment and disposal system improvements. This requirement has lead to a number of problems. The fragmented nature of on-site wastewater management and blurred roles and responsibilities between district and regional councils meant there was a significant lack of clarity over how the building and resource consenting process worked in practice. The consenting process saw the tensions between the authority of mana whenua versus local authorities to determine land-use and the acceptability of wastewater discharges. In addition, the consenting process embodied an understanding of the marae as a building/structure and/or commercial entity rather than as a community institution, a further example

of conflicting boundary judgments between hapū and local government agency perceptions (see Figure 2). Hapū consider the marae as a community institution, whereas local government regulations refer to the marae primarily as a building structure. The implications of these differing boundary judgments are that hapū view wastewater discharge as a cultural issue compared to local government understandings of this as a technical matter. Hapū perceptions are that when addressing marae OSTD cultural aspects such as tikanga and kawa need to be taken into consideration; to not do so will lead to the OSTD to continually fail. In contrast, OSTD failure is attributed by local government agencies to technical shortcomings requiring technical solutions.

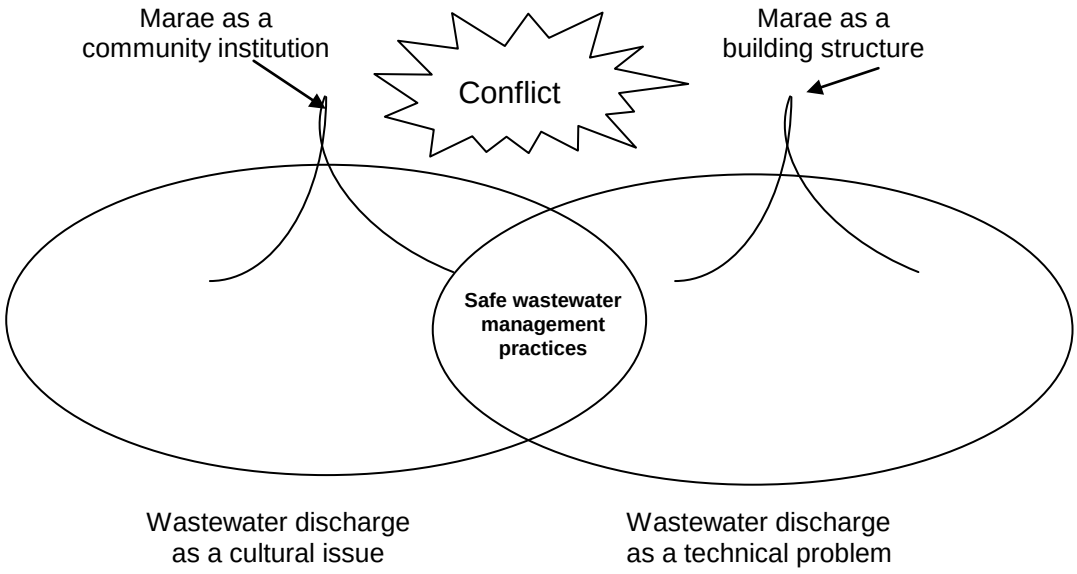

Figure 2: Marae wastewater management as a contested field based on differential perceptions of marae

The categorisation of buildings by council as either residential or commercial has further implications for marae. Marae do not fit into either category; they are not privately owned by individual families as is the case with residential properties, and they do not generate profit as with commercial buildings. However, the location of marae in the commercial category by councils because people stay at the marae and give koha makes marae liable for additional fees and sees them subject to commercial rules and regulations. These additional costs constitute a significant barrier to marae development. Facility upgrades such as improvements to on-site systems incur further fees on the basis of hypothesised increases in marae attendance:

"As you upgrade your marae, [the council] want to tax the marae for increased traffic to your marae, because of increased load on the roads. What we are saying is 'volume is not going to change', we're simply upgrading facilities. There should be no change in our current situation." (Hapū member)

Hapū members were concerned about the general issue of law imposing on Māori *lore*; specifically, marae being inappropriately subjected to council regulations and compliance, and potential challenges to tikanga on what is arguably the last remaining bastion of Māori self-determination:

"We don't want to compromise tikanga for regulations. Compliance versus tikanga is a real issue for our people." (Hapū member)

There was concern that decisions about marae status in relation to council regulations had been made without consultation with hapū.

Both council and hapū representatives asked for and suggested novel ways that council regulations could be applied and compliance met in such a way that satisfied both parties:

"Law is sometimes so stringent…there have to be innovative ways to try and help communities and non-profit organisations, that innovation has come tangata whenua wanting to bring down barriers…being a bit more savvy with applications, councils working with communities, making processes easier, cheaper. None of these groups have sat together before. We need to work through the district council, but that doesn't stop us working together." (Council staff member)

"We need to think about why they [the council] have a regulation and think a creative way around it that still meets the purpose for what it was intended. " (Council engineer)

The general sense from the multi-agency hui was that hapū wish to comply with council regulations, particularly given their strong concerns for the environment as kaitiaki.

"We want a smooth path, we don't want to break the law. We care about the environment." (Hapū member)

Council staff acknowledged the common goals of hapū and councils with respect to maintaining the health and safety of the people, and suggested flexibility as a useful principle to carry forward into future hapū/agency collaboration:

"How do you keep your culture in relation to regulation? The only way you do that is by talking. I think more and more people are looking for a win-win situation. Laws are there to be administered, but how you interpret them is the trick." (Council staff member)

3 EFFORTS TOWARDS INTEGRATION

3.1 ACCORD IN PRINCIPLE

Attempting to understand which, of hapū or local agency views is 'correct' is not necessarily a helpful exercise, given that both are according to particular 'cultural' perspectives. It is more important that both sides understand the perspective of the other and from there can mediate a mutually acceptable solution. A pragmatic approach such as this was supported by Morgan (2004), who proposed the identification of issues upon which technical and cultural paradigms are in agreement as a basis for positive relationships between local authorities and tangata whenua. In the course of dialogue to better address scientific and Māori cultural/spiritual values pertaining to wastewater treatment and management, Tiakiwai et al (2004) observed such common ground; firstly in the form of shared values associated with clean water desired by all participants, and secondly with tangata whenua desire for technical solutions within a cultural framework.

Thus, proponents of increased Māori participation in wastewater management appear to be realistic with regard to what can be achieved moving forward, mindful that tensions will in all probability always exist due to the balance of statutory power that lies with government rather than communities. Efforts to date have focused therefore on establishing a clear rationale and high level agreement for cognisance of Māori values and principles, rather than elimination of conflict. This is a more constructive investment of energy, but has had limited impact on operational level factors that are significant barriers to practical tangata whenua engagement.

3.2 PROGRESS AMIDST COMPLEXITY

As discussed, divergent worldviews can serve to complicate wastewater management. However, even when following existing processes that assume a technical worldview, wastewater management remains a complex area. The process of ensuring that the most appropriate solution to OSTD is identified, installed, operated and maintained is not as simple as it first seems. Management of these basic elements involves multiple central and local government agencies, designers, plumbers, wastewater treatment plant manufacturers as well as hapū members working together to ensure wastewater is adequately treated and safely disposed. In addition, regulation is implemented at a local level, requiring interagency communication between regional councils, district health boards, environmental health officers and building inspectors. Publications such as *Sustainable Wastewater Management: a Handbook for Smaller Communities* (MfE, 2003), and technical standards including *Technical Publication 58* (Auckland Regional Council, 2008) provide information on topics including site assessment and design considerations. However, there is little information that is directly relevant to marae on-site systems. Recognizing the importance of operation and maintenance, MfE has recently issued a discussion document as part of the process of establishing a National Environmental Standard (MfE, 2008).

New Zealand's regulatory context relating to OSTD is governed by four principle Acts of Parliament: the Health Act 1956, Resource Management Act 1991 (RMA), the Building Act 2004 and the Local Government Act 2002 (LGA).

- The Health Act provides a wide-ranging framework for public health action. In particular, it recognizes the role of local authorities, requiring them to promote and conserve the public health. Under the Act local authorities must provide sanitary works and require houses and businesses to have an adequate supply of 'wholesome' water and sanitation.

- The RMA provides for the sustainable use of natural resources in a way that enables people and communities to provide for their social, economic and cultural wellbeing, and their health and safety (section 5). Through regional plans the RMA imposes environmental constraints on systems and the effluent produced (draft on-site standard 1547). Regional councils have established regional plans which identify permitted, controlled, discretionary, and prohibited activities. Territorial authorities will give consent under the Building Act to install a system and will advise if resource consent is required under the RMA.

- The Building Code, first schedule to the Building Regulations 1992, sets out conditions that on-site facilities constructed for the storage, treatment and disposal of industrial liquid waste must meet (section G14.3.2) in order to safeguard people from injury or illness caused by infection or contamination. This includes a requirement that these facilities avoid the likelihood of contamination of soils, ground water, and waterways except as permitted under the RMA. The Code does not set out acceptable solutions or verification methods for OSTD, rather local authority building inspectors are required to assess the quality of the design and implementation of proposed OSTD systems. There are also powers in relation to the complete failure of an on-site system.

- The LGA aims to promote the community's social, economic, environmental and cultural wellbeing; these four factors have to be considered in every wastewater management decision made by council. Section 125 requires a territorial authority to oversee and assess district wastewater service provision, with assessment subject to a public consultation process either in the long-term council community plan, or a special consultative procedure. Under section 146(b)(iii) bylaws can also be made by territorial authorities to manage, regulate against, or prevent the use of land associated with wastewater, drainage and sanitation.

Taking into account that four separate Acts govern OSTDs, it is understandable that the responsibilities and ensuing regulatory functions of the various local government agencies will be confusing and perplexing. In addition the three key areas to on-site wastewater treatment and disposal 1) design (including manufacture); 2) installation; and 3) operation and maintenance, have been identified as factors in 'failure' (Gerry, 1994; Butler and Payne, 1995; Leonard, 2003). 'Audit trails' for poorly performing systems have highlighted that there is a

complex interaction between the agencies and other stakeholders within these three basic areas. Interviews in the current research project also identified common tensions and conflicts, with potential for confusion at any stage of the process. For example:

- Who checks the design? As the application is passed from one council to another there may be confusion over responsibility for checking the design. Automatic approval may be given if the system is from an "approved" supplier, but this does not mean it is suitable for use, as this can only be determined by only a site specific assessment.
- What is an 'approved solution'? A building inspector may interpret an on-site system listed by the Regional Council as 'acceptable' under the Building Code as an approved solution, which means there is no requirement to review the details of installation;
- Who keeps the documentation? Paper trails can be very difficult to follow between departments, different councils and subcontractors. Paperwork and field knowledge can be lost if a subcontractor goes out of business;
- What is in the documentation? Site plans are commonly absent or incorrect, and producers' certificates (if provided) are lost in the system; and
- Who checks on maintenance? If an OSTD does not require consents then the hapū may not be aware of maintenance requirements.

Subsequently, for hapū and HHET there was a significant lack of clarity around how the consent processes worked *in practice*, and how these could be best 'navigated' by hapū. Indeed, in multi-agency and hapū hui it became apparent that this confusion extended beyond hapū and HHET, and that the lack of coordination and communication between agencies with responsibilities for OSTD management was an issue that needed to be addressed if the gains made through community development were to be sustainable.

3.3 MARAE ON-SITE WASTEWATER SYSTEM 'ROADMAP'

A major focus of the research was to assist Hokianga-based marae to address their marae on-site wastewater issues. This involved brokering meaningful relationships between local government, funding agencies and hapū in order to facilitate 'smooth' resource and building consenting processes and gain financial support for marae and system upgrades. A number of barriers to such development were identified in hui:

- Asynchronous funding cycles, and complex criteria and processes for obtaining funding;
- Lack of coordination and communication between agencies with responsibilities for on-site wastewater management;
- Unclear pathways to appropriate design, manufacture, installation and inspection of on-site wastewater systems;
- Inappropriate design for marae and failure of systems which had been approved under the consent process;
- The tapu status of sewage and potential constraints on hapū engagement in addressing the take/issue; and
- Diverse dynamics within the marae environment.

An OSTD 'roadmap' was instigated in order to address these, developed with two Hokianga-based marae working to address their marae on-site waste water systems. Processes involved in complying with council regulations and applying for funding were explored and documented in four key steps, alongside the details of key agencies/contributors, 'helpful hints' and cultural aspects requiring consideration. The roadmap aimed to augment hapū wastewater 'literacy' through provision and clarification of information regarding the 'who, what, how and why' of marae wastewater management. A draft version of the roadmap (see Table 1 below) was presented to local government, funding agency and hapū representatives towards the end of the research project.

Step 1. MARAE PRESENT SITUATION			
TASK	**TOOLS** – How to do it	**RESOURCES** – Who can help/what can they offer/who to talk to	**HELPFUL HINTS**
1A: Marae assessment of septic system condition **Septic tank capability** Soil, lay of land, where does the water come from? Where does the water go? Seepage – frequency where applicable, how does the marae manage this risk? Number of pans, capacity. Flow analysis/what is going into system. **Scoping:** Determine marae requirements: number of hui held per year. **Site assessment:** Land use, soil, slope (gradient), electricity, supply surety, ground water depth, proximity to drinking water source or surface water, available land (e.g. reserve field).	Complete Marae Waste Water and Septic Tank survey	Form a small wastewater team of 2-3 people to liaise with council. This ensures a relationship is built between council staff and hapū members and minimizes council confusion on who to contact. Members need to have knowledge of the present septic system, marae building or functioning capabilities and any marae future development plans, to allow clear communication between all involved in the project. Regional Council offers advice on consenting requirements and technical issues but does not provide engineering assessments/recommendations. Council policy is to provide half an hour of free advice per customer or applicant. Actual and reasonable costs over and above this are charged.	It is optimal to have three people in the team so that if one person leaves or is no longer able to participate, two people remain, are able to work together and share the workload.

TASK	**TOOLS**	**RESOURCES**	**HELPFUL HINTS**
1B: Tikanga and kaupapa issues assessment Ensuring the existing system caters for hui 'shock loading', supports the hau kāinga in their ability to manaaki me te tiaki tangata and the ability to tiaki i te whenua, te wai and the sacredness of the marae, and also upholds the mana of the hapū and area.	Manaaki includes having good toilet facilities or access, sufficient water to run the kitchen and suitable systems for the disposal of wastewater. Ensuring that the land area that contains the system, tanks, piping and soakage field are restricted areas for manuhiri and children, achieved by fencing off, planting, signage or by explaining during a marae gathering. Having appropriate rubbish bins and signage in ablutions that cater for babies' nappies and women's sanitary needs.	Need to work with the marae kaumātua.	The wastewater team also need to look at reserve areas for systems – have option 1, 2, 3 for when fields start to pack up (fields only have a limited lifespan). This should be part of the management plan and the tikanga and kaupapa assessment should feed into this.

Table 1: Tasks 1A and 1B of the Marae On-site Wastewater System Roadmap

Many of the participating agencies viewed the roadmap with skepticism, uncertain whether in terms of tone and focus, it would be accessible for hapū participants. At least two key agencies thought the information was already available. This suggested that there was limited understanding of the issues or the complexity involved for end-users. This commentary failed to recognize that the roadmap was based on intensive engagement with two hapū who had worked successfully through the complex processes of septic tank assessment, application for funding and on-site system installation. Agency representatives were concerned that the roadmap was overly complicated, seemingly unaware from their individual agency perspectives that this reflects the complexity of the on-site wastewater system management area.

Some agency representatives focused on the broader implications of roadmap utilisation, noting that this would require a considerable and difficult culture change for councils, given a shortage of staff with the skills to facilitate effective hapū engagement. Others saw the roadmap as unnecessary, noting their own agencies' tools, solutions or aids and alternative and existing mechanisms for iwi/hapū input such as submissions to annual and long term council community plans, or applications for discretionary/seeding grants for marae development and engineering assistance. These suggestions were made overlooking limitations such as single-agency tools being focused only on certain aspects of the OSTD process, lack of iwi/hapū time and capacity, and inability to achieve substantial change via the submissions process. A more effective mechanism suggested by one participant was to formalise an annual council/mana whenua meeting to put forward suggestions for the annual plan prior to the submissions stage.

Nonetheless other agency participants could appreciate the value of the roadmap in providing information to hapū and demystifying marae on-site systems management and upgrade processes:

"It is also about providing information. As well as a process, it is a repository of information which it provides…and it empowers people to take steps without paying experts to do this for them." (Local government agency participant)

They also saw the roadmap as particularly useful in catering for unique barriers that hapū face in addressing failing marae on-site wastewater systems. Clarification of relevant tikanga by hapū was noted as an excellent consideration, enabling hapū to better manage external 'experts' and avoid wasting time and money on culturally unacceptable designs.

The success of the Pākanae and Otaua Marae building committees in securing funding and consents for marae improvements and installation of new OSTD systems is testament to both the value of the roadmap and the tenacity and determination of the hapū to see these kaupapa through to completion. The completion of the Pākanae on-site upgrade (from a household septic system to a treatment plant) demonstrated to other marae and hapū that improving their on-site wastewater systems was possible despite a variety of institutional, organizational and community barriers. Two additional marae are presently installing new wastewater systems having utilized the roadmap and processes, and others are currently working through initial roadmap stages. Plans are underway to apply for sustainable management funding to further develop the roadmap. An MfE representative on the research advisory group noted the potential of the roadmap to contribute significantly to on-site wastewater management, suggesting utility for district and regional councils' better appreciation of marae on-site wastewater issues, and as a basis for hapū engagement guidelines for consulting engineers and council officers.

4 DISCUSSION

The roadmap developed in the course of Te Riu o Hokianga was an attempt to bridge hapū and council boundaries in relation to marae on-site wastewater management. Given the divergent worldviews, values and

boundary judgments held by tangata whenua and local/central government and tensions relating to perceived legitimacy and appropriate approaches, this seemed a constructive way forward.

Similarly to the work of Tiakiwai et al (2004), the roadmap provided a starting point for dialogue between tangata whenua and other wastewater stakeholders. In accordance with the recommendations of Morgan (2004), it brought cultural and engineering perspectives together, and explored processes involved in marae on-site wastewater development as common ground for achieving shared goals.

For participating hapū, utilization of the roadmap in multi-agency hui enhanced their knowledge and understanding about the links between wastewater and health, and the design and maintenance of on-site wastewater systems. Hapū awareness of the issues and processes involved as well as their ability to engage with these was also increased, thereby strengthening their mana and sense of empowerment.

As a dialogue tool the roadmap stimulated in-depth discussion of marae on-site wastewater systems and the respective roles of local government, central government and mana whenua. This shed some light on the complexity of wastewater management, and helped clarify the potential and constraints of hapū/Māori community action in this area. Community action was strengthened through the development of relationships with district/regional councils and funding organisations. However, the dependence of community action on a supportive institutional environment emerged as a key limitation. Te Riu o Hokianga succeeded in forming relationships between individual hapū members and staff from a number of agencies, and found ways to side-step organizational barriers, but there was little evidence of *organizational learning* or commitment to change. Overall resistance to the roadmap from agency representatives suggested an unwillingness to explore alternative processes to those of the status quo, despite acknowledged inadequacies. This compromises the sustainability of the roadmap as a solution to improving on-site wastewater systems; if key individuals/contacts leave participating organizations, relationship building process will have to start again.

With a focus on consensual, non-confrontational organizing rather than contesting marginalization processes, the roadmap was not able to challenge existing power relationships. Consequently, key barriers of fragmentation and limited resources were not able to be overcome. The inability to resolve fragmentation in wastewater management is understandable, given the link to poor communication and unclear roles in the sector, inconsistencies between wastewater system operation and management by local authorities, and gaps in operation, maintenance and performance monitoring of systems (Duffill Watts and King Ltd et al, 2005).

Although not resolved, the roadmap-based discussion paved the way for costs associated with marae on-site wastewater management to be queried. Discussions were held with an iwi liaison officer about council budget for marae consultation of consulting engineers regarding their on-site wastewater needs, as part of the first step in an application for funding; and council committed to ongoing discussions with marae committees about how compliance costs are determined, and the need for submission to the district planning process regarding the creation of a new ‘marae’ category for building consents.

5 CONCLUSION

The past few decades have seen increased legal and community recognition of the significance of the Treaty of Waitangi, and subsequently, the legitimacy of Māori cultural values within te ao Pākehā. This has had direct

impact on wastewater management thinking, prompting greater scrutiny of existing modes of treatment and disposal and enabling consideration of alternative and innovative approaches. Based on an eco-systemic view of the world and derived from 'flax roots' communities, Māori values and practices have considerable potential to contribute towards best practice water and waste management via sustainable, acceptable wastewater solutions. Consequently strengthened ability for cultural guardianship is an additional and significant benefit for Māori.

Marae on-site wastewater systems are unique within wastewater management. Although such systems are more consistent with culturally appropriate land-based disposal practices, their location on marae invoke Māori customs and traditions that must be given due consideration. As neither residential nor commercial structures, marae do not fit comfortably within existing regulations. These factors call for a distinct approach to marae on-site systems.

A 'roadmap' for marae on-site wastewater treatment and disposal management was developed and trialed in the current research project to integrate cultural and technical understandings, and, through multi-agency working, facilitate hapū empowerment and capacity for action and wastewater system improvements. The roadmap was successful in mediating these outcomes for participating hapū, but owing to its focus on short term outcomes it fell short in effecting institutional change, a much broader matter necessitating reflection on governance arrangements. This highlights the insufficiency of dialogue and cultural 'accommodation' in addressing power imbalances, raising the need for organizational reorientation in addition to community development. This has implications for Māori/Crown 'partnerships', reinforcing the importance of Crown organizations and institutions adopting increased responsibility for community engagement, and seeking alternative mechanisms such as power-sharing to do so.

The roadmap documents what has worked in practice for specific marae, in relation to marae on-site systems. How it might be applied elsewhere is beyond the scope of the current research. A point of broader relevance is the opportunity presented by hapū, iwi and marae development initiatives that are currently underway. Hapū, iwi and marae are actively pursuing their advancement across a range of issues, the benefits of which, in terms of community, social and environmental outcomes, will be shared by wider society. This constitutes a significant resource for collaboration which could afford to be further supported by local and central government.

GLOSSARY

hāmuti	faeces
hapū	clan/sub-tribe
hau kāinga	the home people
hauora	health
Hokianga	region in Northland, New Zealand
hōpua kaukau	bathing areas
hui	to meet, or a meeting on a specific issue
iwi	tribal group

kai	food
kāinga	home/s
kaitiaki	guardian, custodian; iwi, hapū or whānau group with the responsibilities of kaitiakitanga
kaitiakitanga	guardianship, trusteeship; the responsibilities passed down from the ancestors, for tangata whenua to take care of the places, natural resources and other taonga in their tribal area
kaumātua	elder/s
kaupapa	agenda, topic
kaupapa Māori	an approach that is for, by and with Māori
kawa	protocol
koha	donation, gift
mahinga kai	food that is gathered on land or water
mana	prestige, charisma, status, respect, dignity, influence, power
manaaki	to care for or show hospitality
mana whenua	authority of the land; traditional status, rights and responsibilities of hapū as residents in the tribal area
manuhiri	guest/s
Māori	indigenous people of Aotearoa/New Zealand
marae	meeting area of whānau or iwi, focal point of settlement, central area of village and its buildings
mauri	life-force, essence
Ngāi Tahu	tangata whenua of the lower South Island
noa	un/non-restricted, usable
paepae hāmuti	latrine/s
Papatūānuku	earth mother
rāhui	temporary prohibition/ban, protection of a place or resources by forbidding access or harvest
take	issue
tamariki	children
tangata/tāngata	person/people
tangata whenua	people of the land
tangihanga	funeral

tapu	restricted, sacred
te ao Pākehā	the Pākehā/non-Māori world
tiaki	to care for
tikanga	customs, traditions
Treaty of Waitangi	founding document of New Zealand, treaty between Māori and the British Crown signed in 1840
wai	water
whakamā	shame
whakanoa	to make noa, lessen tapu, render usable
whānau	extended/nuclear family
whenua	land

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